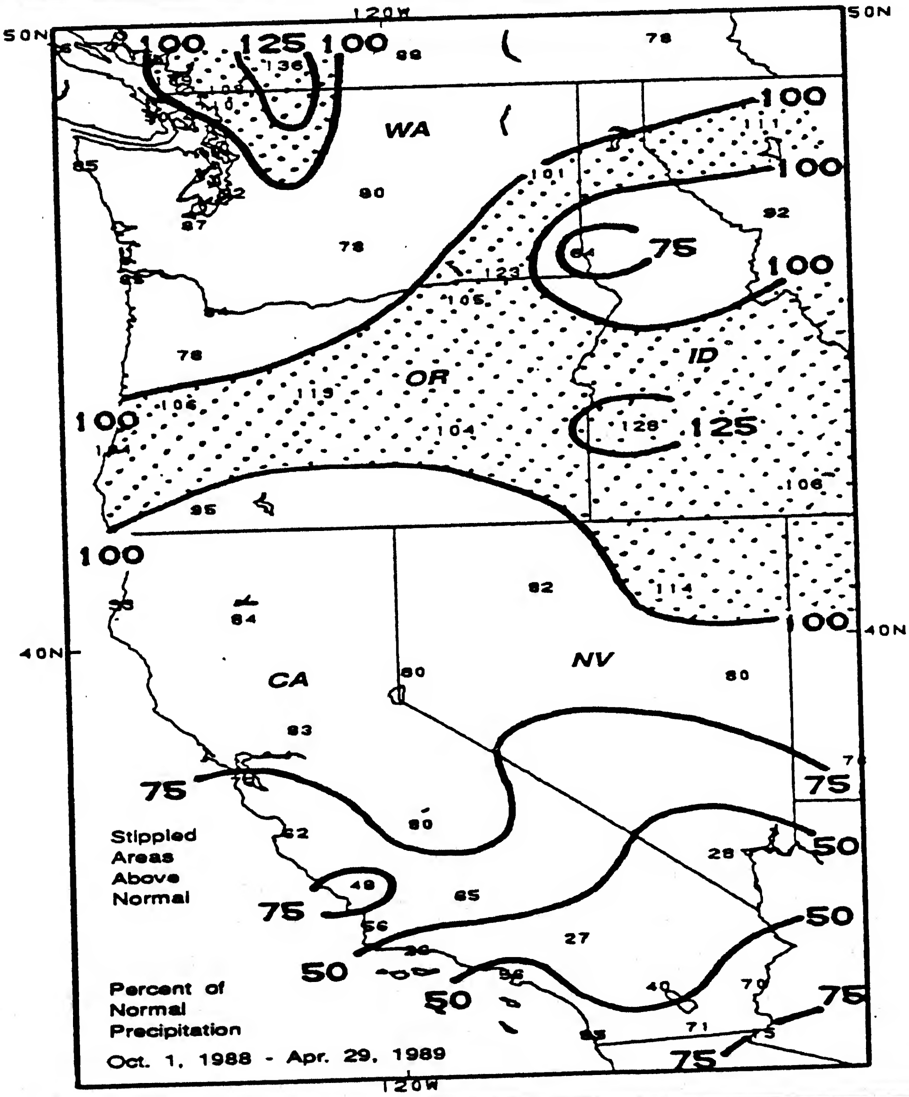
CLIMATE ANALYSIS CENTER

WEEKLY CLIMATE BULLETIN

No. 89/17 Washington, DC April 29, 1989



WITH THE APPROACH OF THE NORMALLY DRY SUMMER MONTHS, MANY AREAS ALONG THE PACIFIC COAST AND IN THE INTERMOUNTAIN WEST HAVE RECEIVED SUBNORMAL PRECIPITATION DURING THE RAINY SEASON (OCTOBER-APRIL), MARKING THE THIRD CONSECUTIVE YEAR THAT MOST OF CALIFORNIA HAS RECORDED INADEQUATE PRECIPITATION. FOR FURTHER DETAILS, REFER TO THE SPECIAL CLIMATE SUMMARY COMMENCING ON PAGE NINE.

UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE - NATIONAL METEOROLOGICAL CENTER

WEEKLY CLIMATE BULLETIN

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This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief, concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

- Highlights of major global climatic events and anomalies.
- U.S. climatic conditions for the previous week.
- U.S. apparent temperatures (summer) or wind chill (winter).
- Global two-week temperature anomalies.
- Global four-week precipitation anomalies.
- Global monthly temperature and precipitation anomalies.
- Global three-month precipitation anomalies (once a month).
- Global twelve-month precipitation anomalies (every 3 months).
- Global temperature anomalies for winter and summer seasons.
- Special climate summaries, explanations, etc. (as appropriate).

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Center via the Global Telecommunication System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

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GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF APRIL 29, 1989

1. Coastal sections of British Columbia and Alaska:

REGION REMAINS DRY.

Generally less than 12 mm of precipitation was reported at most stations as very dry conditions persisted [10 weeks].

2. Western United States:

WARM CONDITIONS END.

Colder air, with temperatures as much as 5°C below normal, replaced the unusually warm weather regime (see U. S. Weekly Climate Highlights) [Ended at 9 weeks].

3. Central United States:

RAINS BRING RELIEF.

Up to 64 mm of precipitation fell in parts of Minnesota and Iowa and brought some relief from the dry conditions (see U. S. Weekly Climate Highlights) [Ending at 6 weeks].

4. Argentina:

DRYNESS CONTINUES TO EASE.

As much as 75 mm of rain fell in extreme northern Argentina; however, less than 10 mm was measured at many stations to the south. Long-term deficits remain as the dry season approaches [44 weeks].

5. Europe and the Middle East:

COLD AIR INVADES.

Temperatures fell to around 9°C below normal across much of western Europe as unseasonably warm conditions were limited to Turkey and the Middle East [Ending at 16 weeks].

6. South Africa:

WETNESS DEVELOPS.

Unusually heavy precipitation, up to 61 mm, fell in many parts of southern South Africa [4 weeks].

7. Eastern Asia:

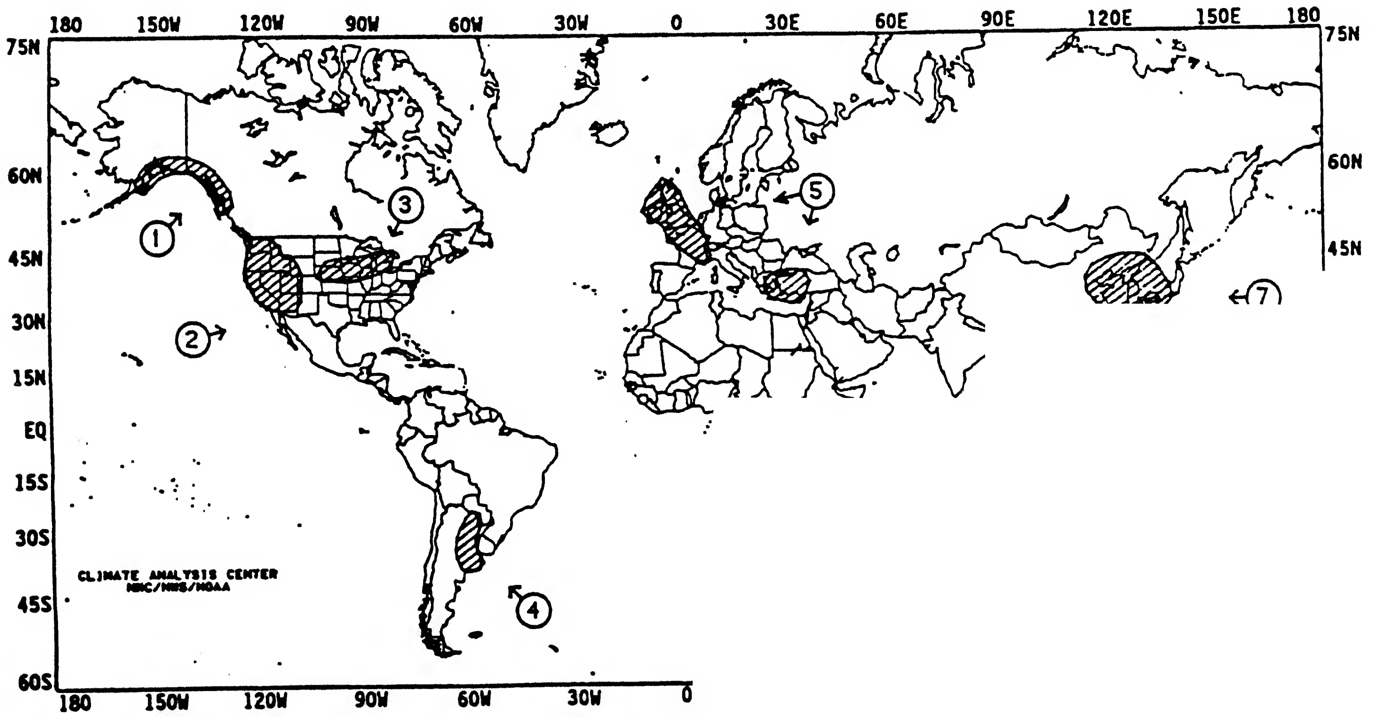
WARM CONDITIONS DIMINISH.

Temperatures returned to near normal across most of east central China, Korea, and Japan [Ended at 10 weeks].

8. Eastern Australia:

MORE RAINS.

Heavy precipitation, approaching 200 mm in New South Wales, fell across much of eastern Australia as abnormally wet weather persisted [7 weeks].



EXPLA

TEXT: Approximate duration of anomalies is in brackets. week's values.

MAP: Approximate locations of major anomalies and epis current two week temperature anomalies, four week prec

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF APRIL 23 THROUGH APRIL 29, 1989.

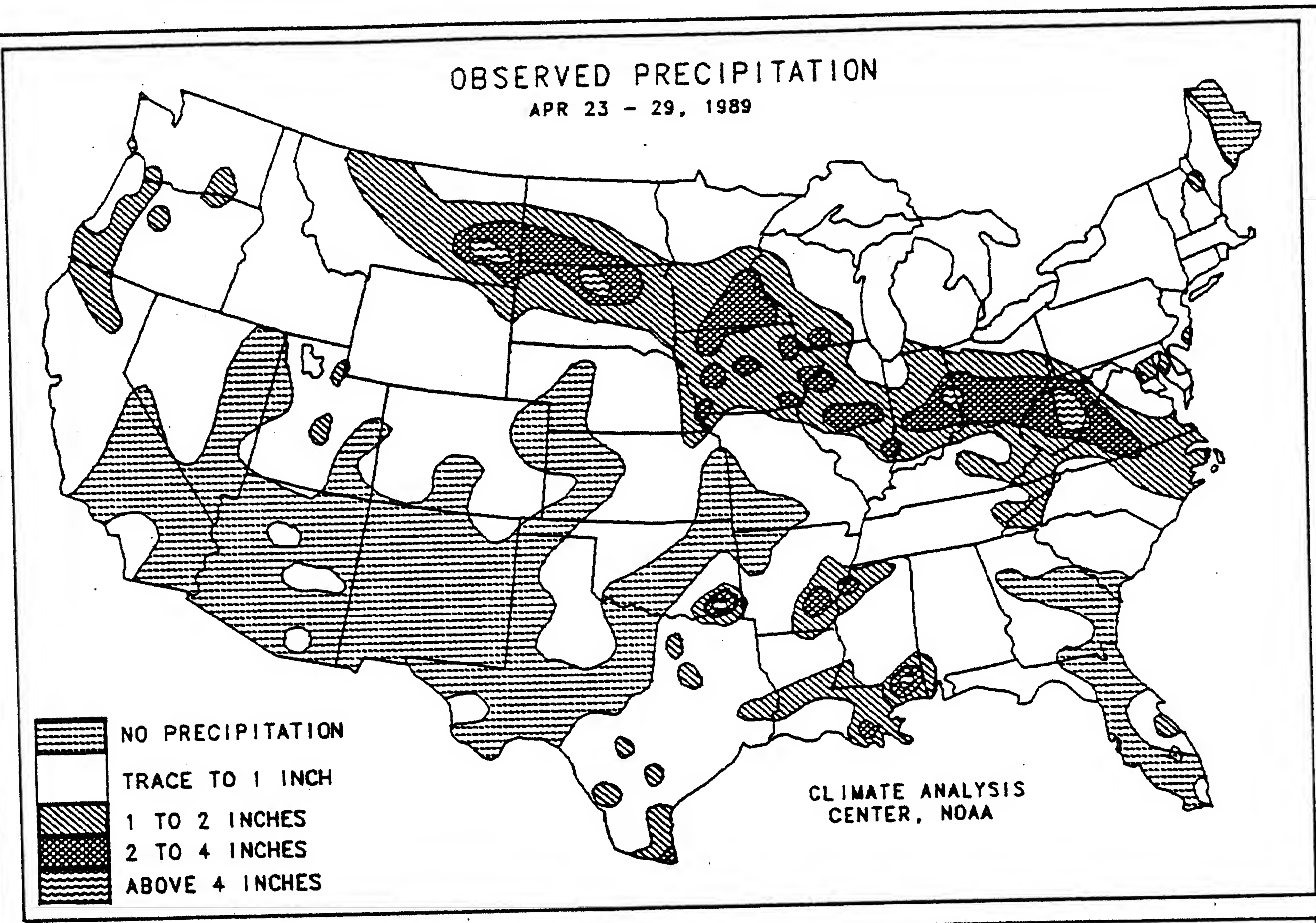
After several weeks of unseasonably warm veather, cooler air returned to the Far West. In the astern half of the country, summer-like heat covered he southern and central portions of the Great Plains nd Midwest and most of the Southeast while ubnormal temperatures were recorded throughout the lortheast. The boundary between these two air masses lefined a stationary front that stretched from the Dakotas eastward to the central Appalachians and outheastward to the North Carolina coast. During the veek, several low pressure centers developed along his front, triggering numerous outbreaks of severe veather that included torrential downpours, large hail, lamaging winds, and dozens of tornadoes. Heavy ains from these strong thunderstorms raised many ivers above the flood stage in West Virginia. Severe veather also hit parts of the southern Great Plains as cool, dry air from the Rockies collided with hot, numid air from the Gulf of Mexico. Although precipitation was not excessively heavy, softball-sized hail fell near Ft. Worth, TX and several tornadoes touched down in southern Oklahoma. Farther west, an upper-level disturbance brought scattered showers and thunderstorms to the central Pacific Coast, with reports of small hail in northern California and a rare tornado in central California, and heavy snows to the higher elevations of the Sierra Nevada and Cascade Mountains. Late in the week, a winter-like storm intensified in the Great Basin and raced northeastward, spreading rain and snow across the northern Rockies, northern Great Plains, and upper Midwest and dumping more than a foot of snow on the higher elevations of the Rockies.

According to the River Forecast Centers, the heaviest precipitation fell along the stationary front from southwestern North Dakota southeastward to northeastern North Carolina (see Table 1). Between 2 and 5 inches of precipitation was reported in southern North Dakota, northern South Dakota, southeastern Minnesota, eastern Indiana, southern Ohio, the central parts of West Virginia and Virginia, and northeastern North Carolina. More than 2 inches of precipitation was also measured at scattered stations in central Texas, southwestern Arkansas, along the central Gulf and southeastern Alaskan Coasts, and in western Oregon, while Hilo, HI was inundated with nearly a foot of rain. Light to moderate amounts occurred along the central Pacific Coast, in the northern halves of the Intermountain West, Rockies, and Great Plains, and throughout most of the eastern half of the nation with the exception of Georgia and Florida. Little or no precipitation fell along the southern and extreme northern Pacific Coasts, on the southern halves of the Intermountain West, Rockies, and Great Plains, along the eastern Gulf and southern Atlantic Coasts, and in parts of the Northeast.

The extreme warmth that persisted across the Far West during the past several weeks was replaced by cooler conditions, while subnormal temperatures remained in the Northeast. The greatest negative temperature departures (between -6° and -11°F) were recorded in Montana, the central Intermountain West, and the northern Appalachians (see Table 2). In contrast, unseasonably hot weather spread across the southern half of the Great Plains, the lower Midwest, and the Southeast. The greatest positive departures (between +12° and +16°F) occurred in the central Great Plains and middle Mississippi Valley; however, temperatures averaged more than 5°F above normal in most of the Great Plains, Midwest, and Southeast and along the Pacific Northwest (see Table 3). Nearly 100 stations tied or set new daily maximum temperature records during the week as highs in the nineties were common in the Great Plains, lower Midwest, and Southeast while parts of Kansas, Oklahoma, and Texas surpassed 100°F (see Figure 1).

TABLE 1. Selected stations with more than 2.00 inches of precipitation for the week.

Station	Total(In)	Station	Total(In)
[illegible]awaii, HI	11.99	Kodiak, AK	2.52
[illegible], AK	5.06	Spencer, IA	2.48
[illegible]d Co., WV	3.30	Charleston, WV	2.48
[illegible]	3.21	Cincinnati, OH	2.39
[illegible]	3.04	Washington/Andrews AFB, MD	2.32
[illegible]	2.96	Dickinson, ND	2.31
[illegible]iver NOB, NC	2.89	Minneapolis, MN	2.11
Brownsville, TX	2.83	Pine Bluff, AR	2.05
Springfield, IL	2.81	Aberdeen, SD	2.03
Dayton/Wright-Paterson AFB, OH	2.64	Moline, IL	2.02
Rochester, MN	2.52		


OBSERVED PRECIPITATION
APR 23 - 29, 1989
NO PRECIPITATION
TRACE TO 1 INCH
1 TO 2 INCHES
2 TO 4 INCHES
ABOVE 4 INCHES
CLIMATE ANALYSIS
CENTER, NOAA

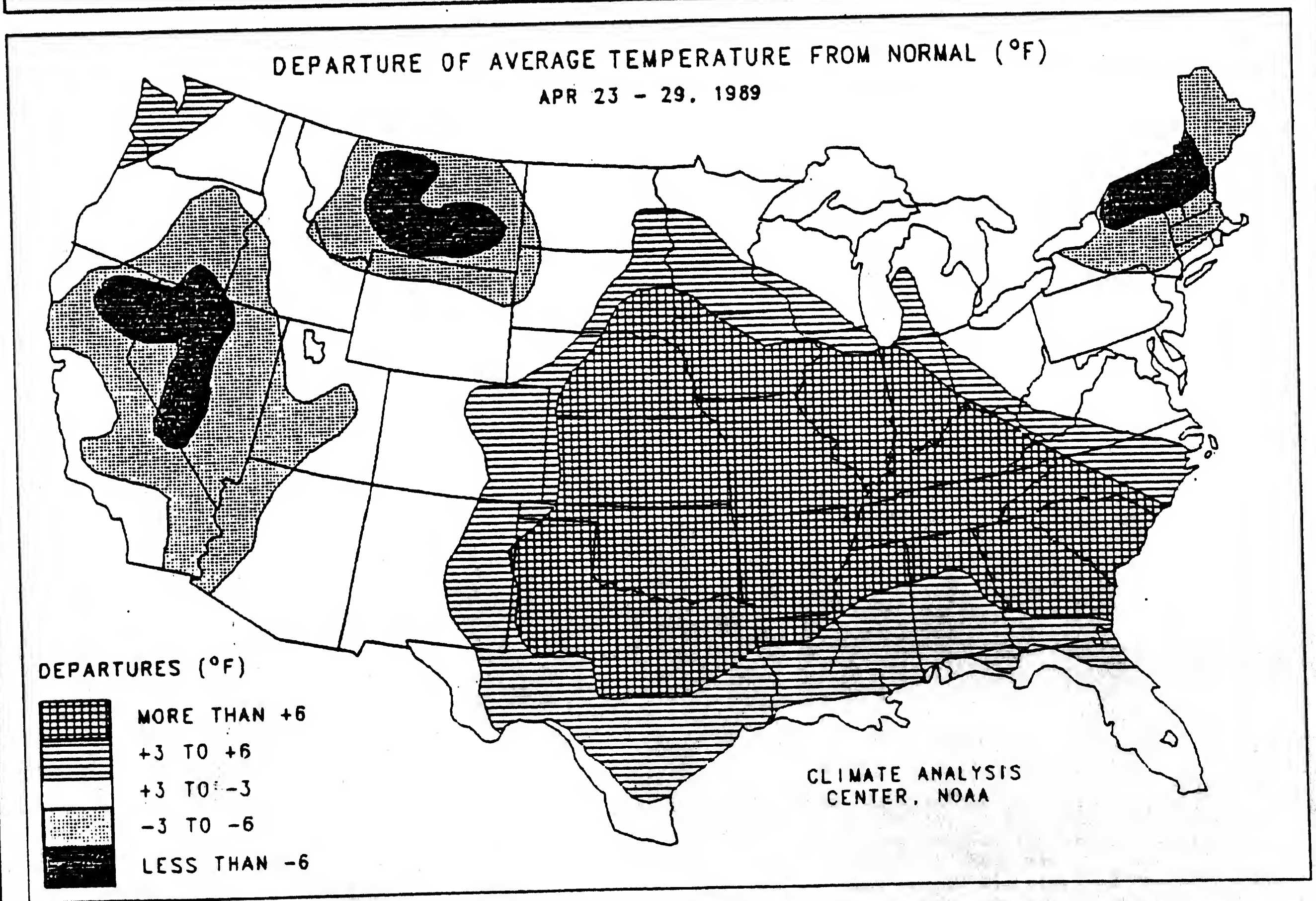

DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)
APR 23 - 29, 1989
DEPARTURES (°F)
MORE THAN +6
+3 TO +6
+3 TO -3
-3 TO -6
LESS THAN -6
CLIMATE ANALYSIS
CENTER, NOAA

TABLE 2. Selected stations with temperatures averaging 5.0°F or more BELOW normal for the week.

Station	Degrees F Dep.	Avg.	Station	Degrees F Dep.	Avg.
Mt. Washington, NH	-10.6	16.1	Rome/Griffiss AFB, NY	-6.4	43.9
Redding, CA	- 8.9	54.0	Utica, NY	-6.3	42.7
Great Falls, MT	- 8.3	38.5	Helena, MT	-6.2	39.9
Billings, MT	- 7.3	41.2	Havre, MT	-6.2	41.6
Miles City, MT	- 7.2	42.4	Reno, NV	-6.2	42.8
Winnemucca, NV	- 7.1	41.2	Blythe, CA	-6.2	67.4
Montpelier, VT	- 6.7	38.7	Lovelock, NV	-5.9	45.7
Bozeman, MT	- 6.6	39.4	Poughkeepsie, NY	-5.8	46.1
Burlington, VT	- 6.6	40.7	Barrow, AK	-5.5	-0.2
Concord, NH	- 6.6	41.6	Cut Bank, MT	-5.2	37.8
Glens Falls, NY	- 6.6	42.5	Augusta, ME	-5.2	42.1
Lebanon, NH	- 6.4	40.5	Syracuse, NY	-5.1	45.3
Massena, NY	- 6.4	41.3	Burns, OR	-5.0	41.1

TABLE 3. Selected stations with temperatures averaging 10.0°F or more ABOVE normal for the week.

Station	Degrees F Dep.	Avg.	Station	Degrees F Dep.	Avg.
Salina, KS	+15.6	74.1	Columbia, MO	+12.0	71.3
Concordia, KS	+15.1	72.3	Ottumwa, IA	+11.9	67.7
Russell, KS	+14.7	72.1	Sioux City, IA	+11.7	66.4
St. Louis, MO	+14.6	74.7	Grand Island, NE	+11.7	66.2
Lincoln, NE	+14.2	69.9	Dodge City, KS	+11.6	69.9
Topeka, KS	+14.1	72.8	Paducah, KY	+11.5	73.2
Evansville, IN	+13.5	73.7	Jackson, TN	+11.2	75.8
Belleville/Scott AFB, IL	+13.5	73.7	Tulsa, OK	+11.2	75.7
Fayetteville, AR	+13.3	74.5	Chanute, KS	+10.9	71.5
Harrison, AR	+13.0	74.2	Crossville, TN	+10.7	69.4
Nashville, TN	+12.9	76.1	Atlanta, GA	+10.6	75.4
Bowling Green, KY	+12.8	73.7	Jonesboro, AR	+10.5	74.9
Norfolk, NE	+12.8	66.4	Charleston, SC	+10.4	77.5
Kansas City/Intl., MO	+12.6	72.7	Blytheville AFB, AR	+10.4	75.2
Kansas City/Muni., MO	+12.5	73.5	Northway, AK	+10.4	45.1
Quincy, IL	+12.4	69.6	Memphis, TN	+10.3	76.4
North Omaha, NE	+12.4	69.0	Fort Smith, AR	+10.3	74.9
Joplin, MO	+12.3	74.1	Hobart, OK	+10.2	74.0
Springfield, MO	+12.3	71.8	Oklahoma City, OK	+10.1	73.8
Des Moines, IA	+12.3	67.5	Gage, OK	+10.1	71.3
Wichita, KS	+12.2	72.3	Chattanooga, TN	+10.0	73.2

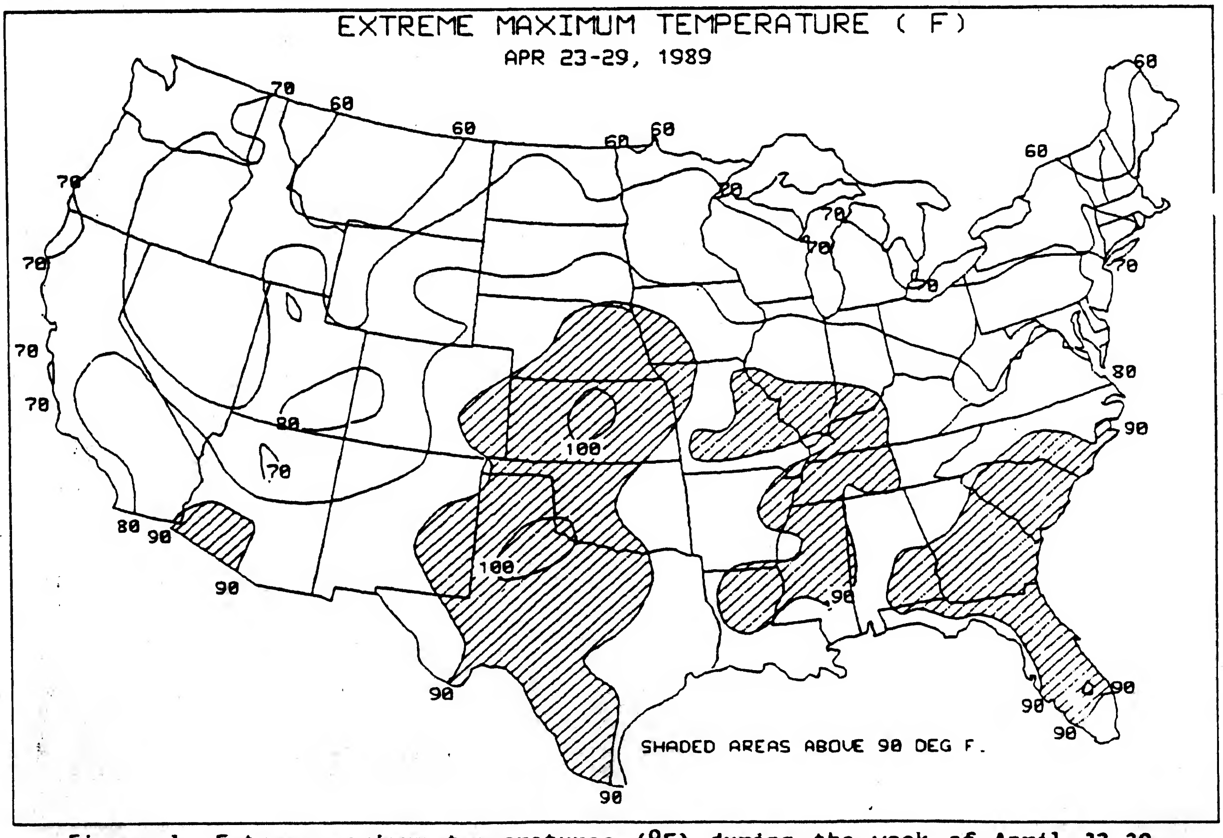
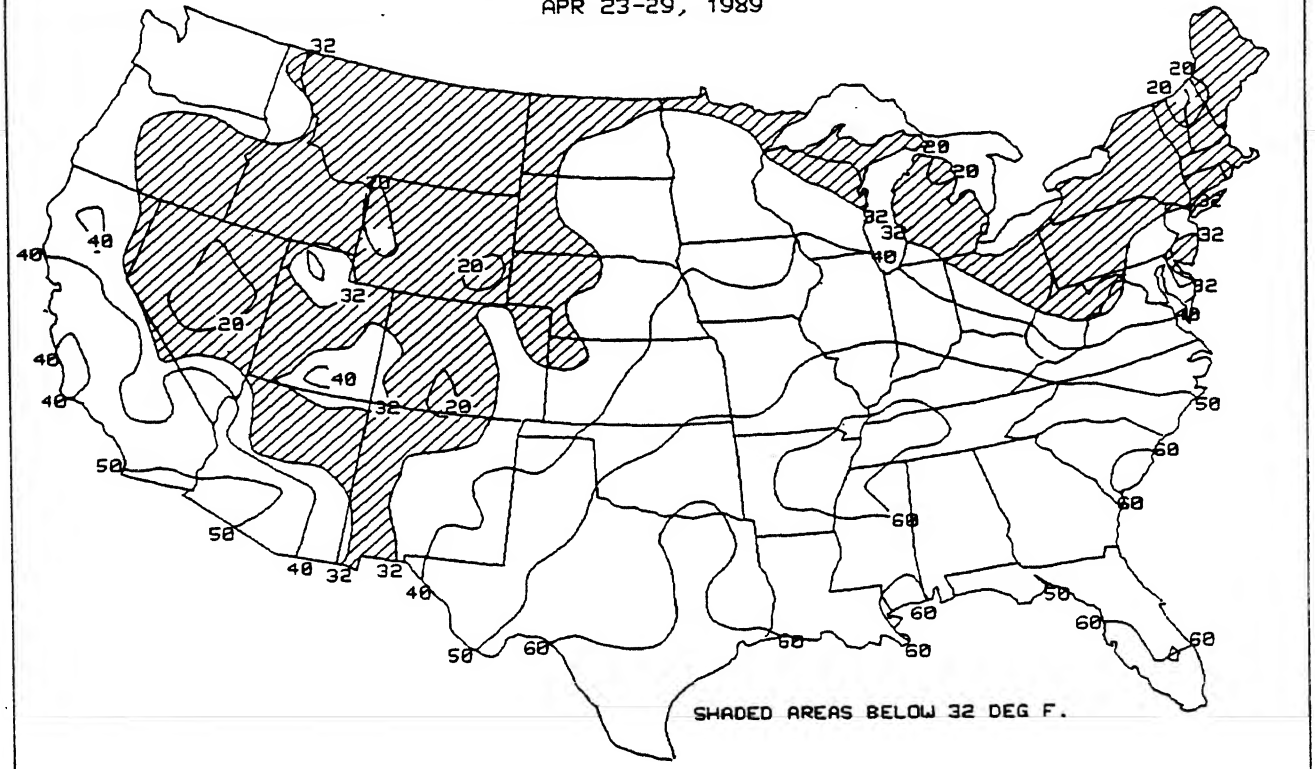


Figure 1. Extreme maximum temperatures (°F) during the week of April 23-29, 1989. Unseasonably hot weather prevailed throughout the southern half of the Great Plains, the lower Midwest, and the Southeast as most stations recorded highs in the eighties and nineties while triple-digit readings occurred in parts of Kansas, Oklahoma, and Texas.

EXTREME MINIMUM TEMPERATURE (°F)

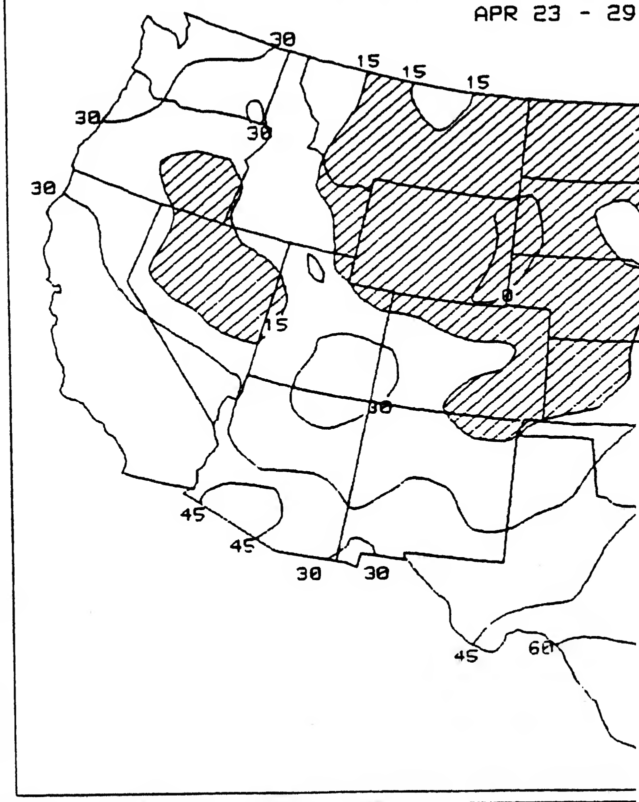
APR 23-29, 1989

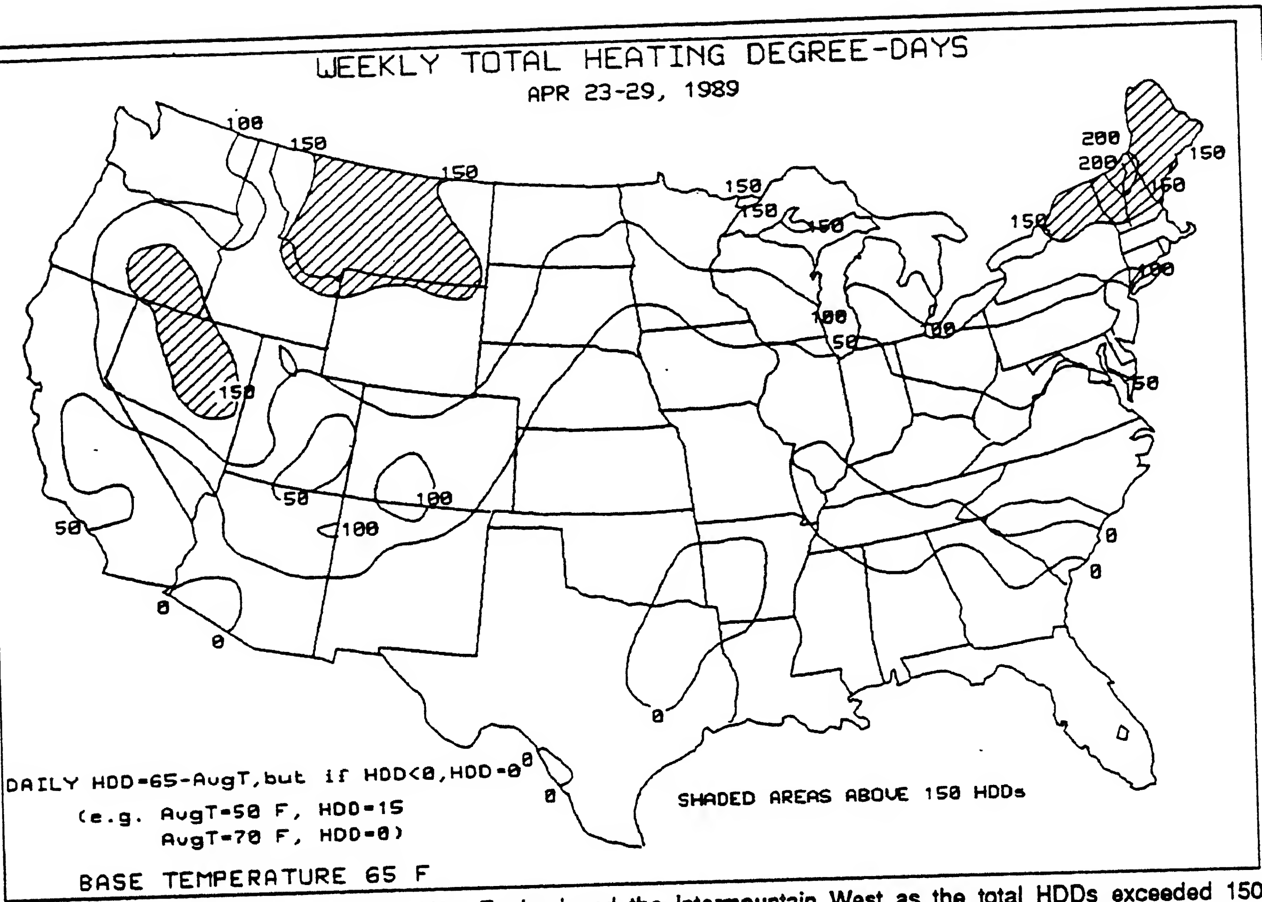


While subfreezing readings occurred throughout the Rockies, New England, and the Great Lakes, unseasonably warm air in the Southeast, lower Midwest, and Great Plains kept minimum temperatures well above 32°F (top). Subzero wind chills were limited to portions of the north-central Plains and northern New England as warm weather covered much of the nation (bottom).

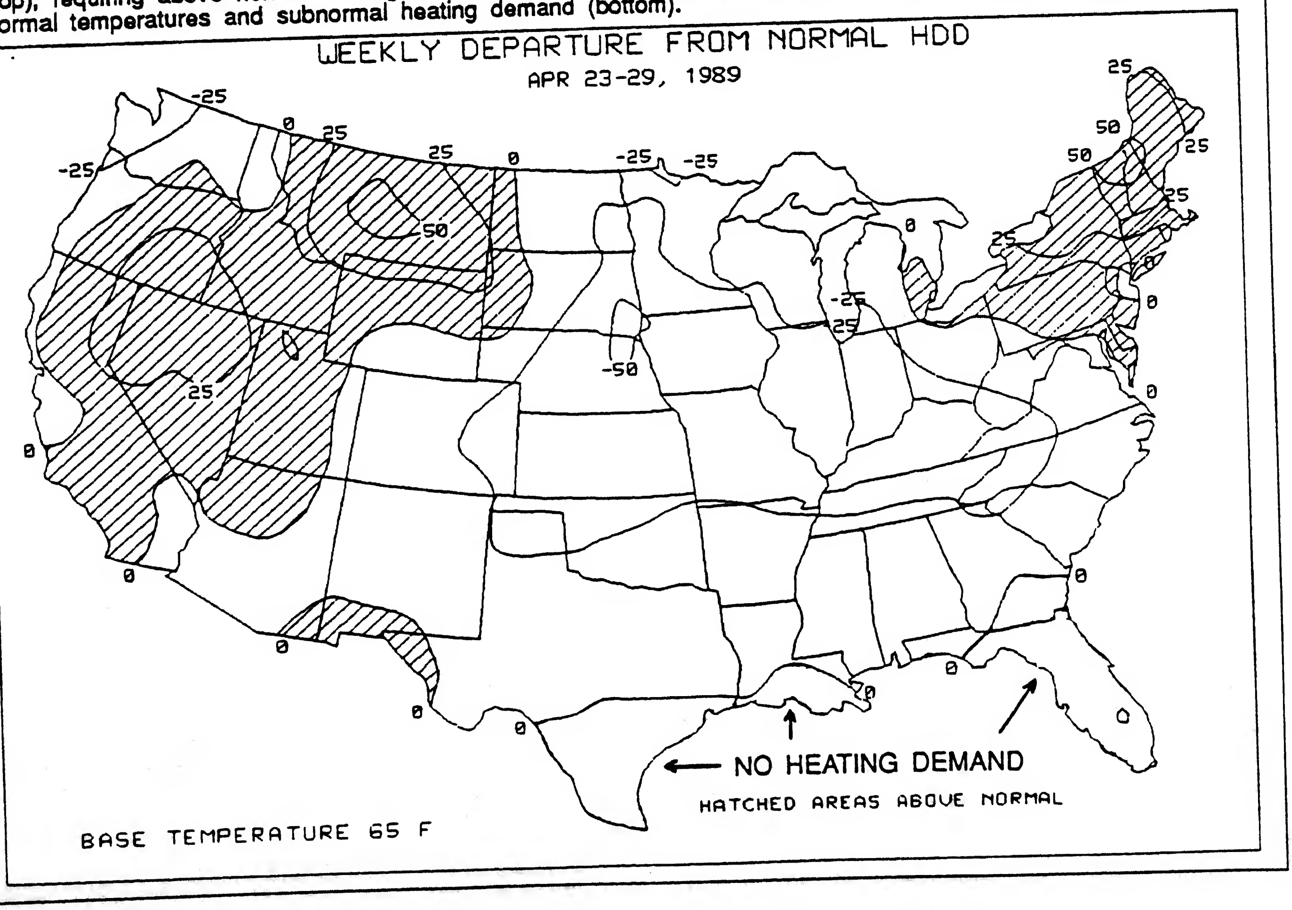
MINIMUM WIND CHILL (°F)

APR 23 - 29, 1989



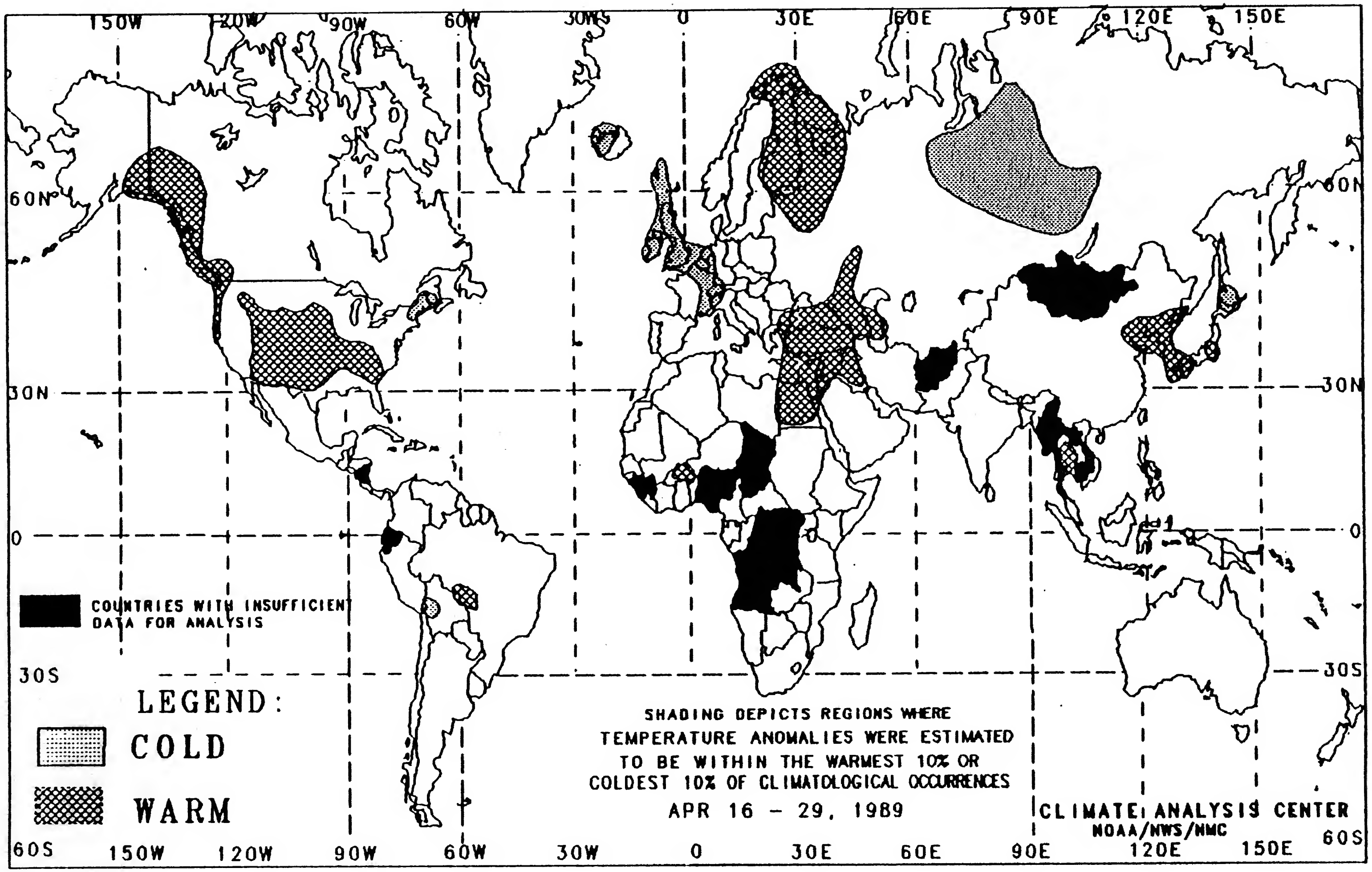


Unseasonably cold air resided over New England and the Intermountain West as the total HDDs exceeded 150 (top), requiring above normal heating demand in those areas while the center of the country experienced above normal temperatures and subnormal heating demand (bottom).



GLOBAL TEMPERATURE ANOMALIES

2 WEEKS

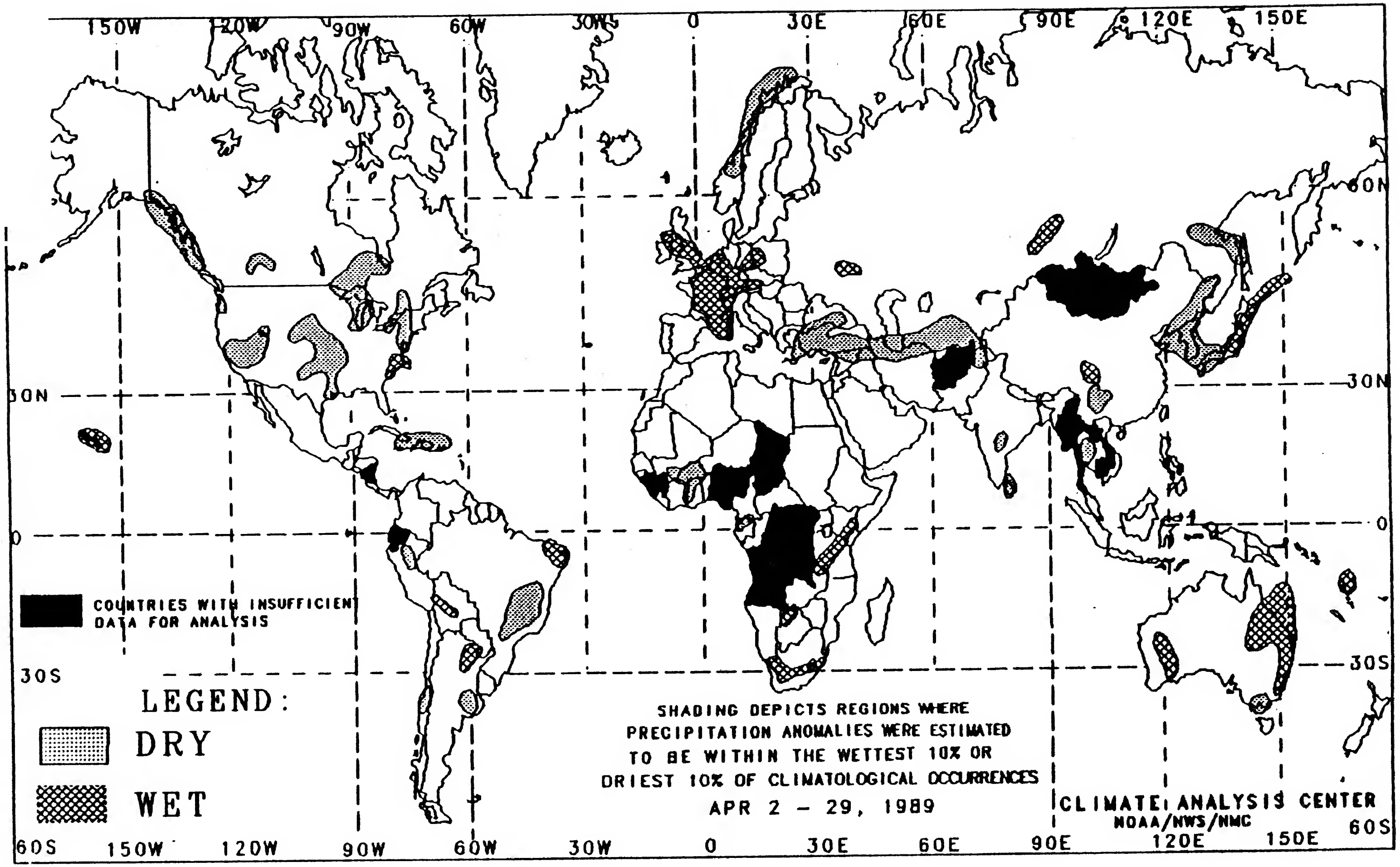


The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

Temperature anomalies are not depicted unless the magnitute of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were recieved or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South Africa, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

The chart shows general areas of four week predipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

SPECIAL CLIMATE SUMMARY

Climate Analysis Center, NMC
National Weather Service, NOAA

ANOTHER SUBNORMAL RAINY SEASON (OCTOBER-APRIL) FOR MOST OF THE FAR WEST, ESPECIALLY CALIFORNIA

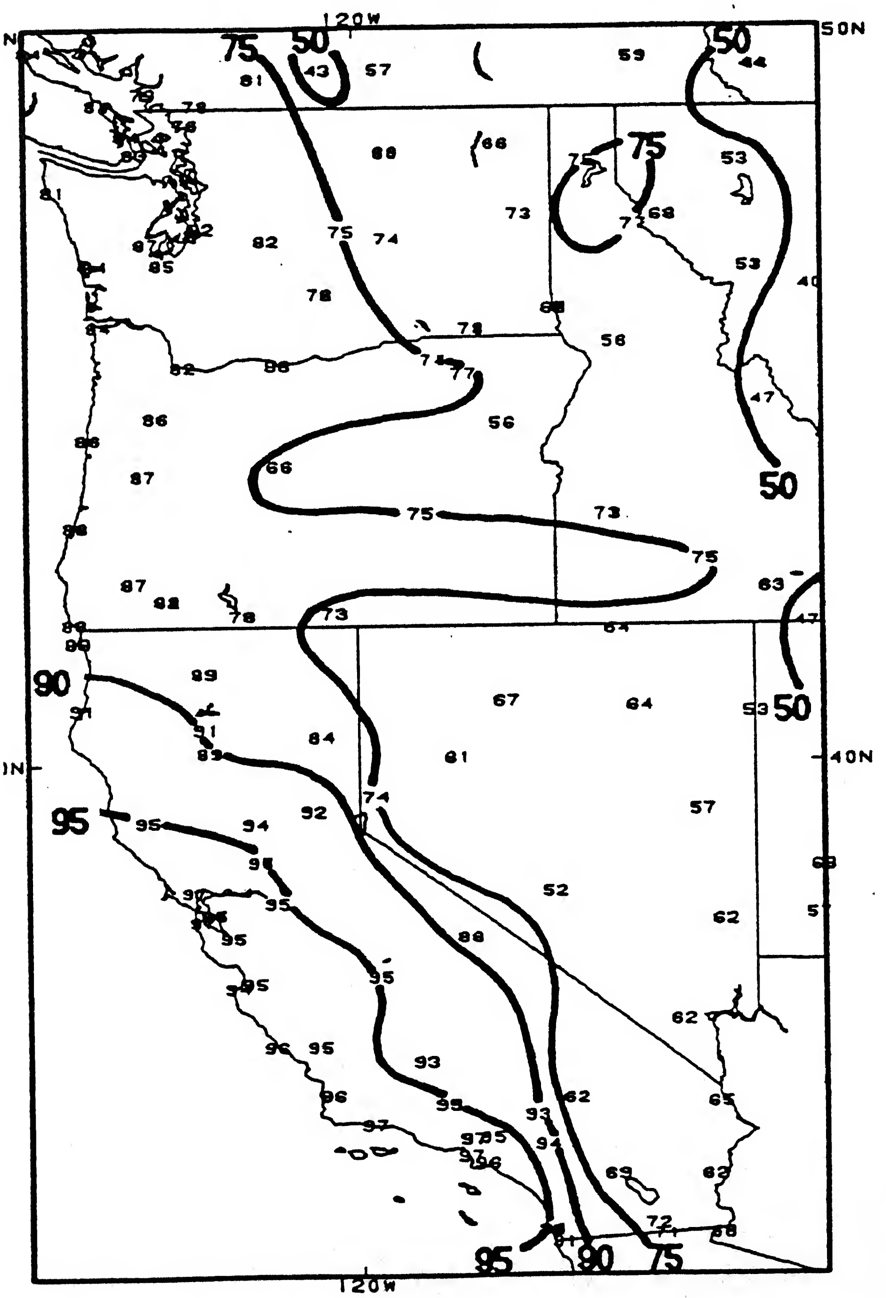
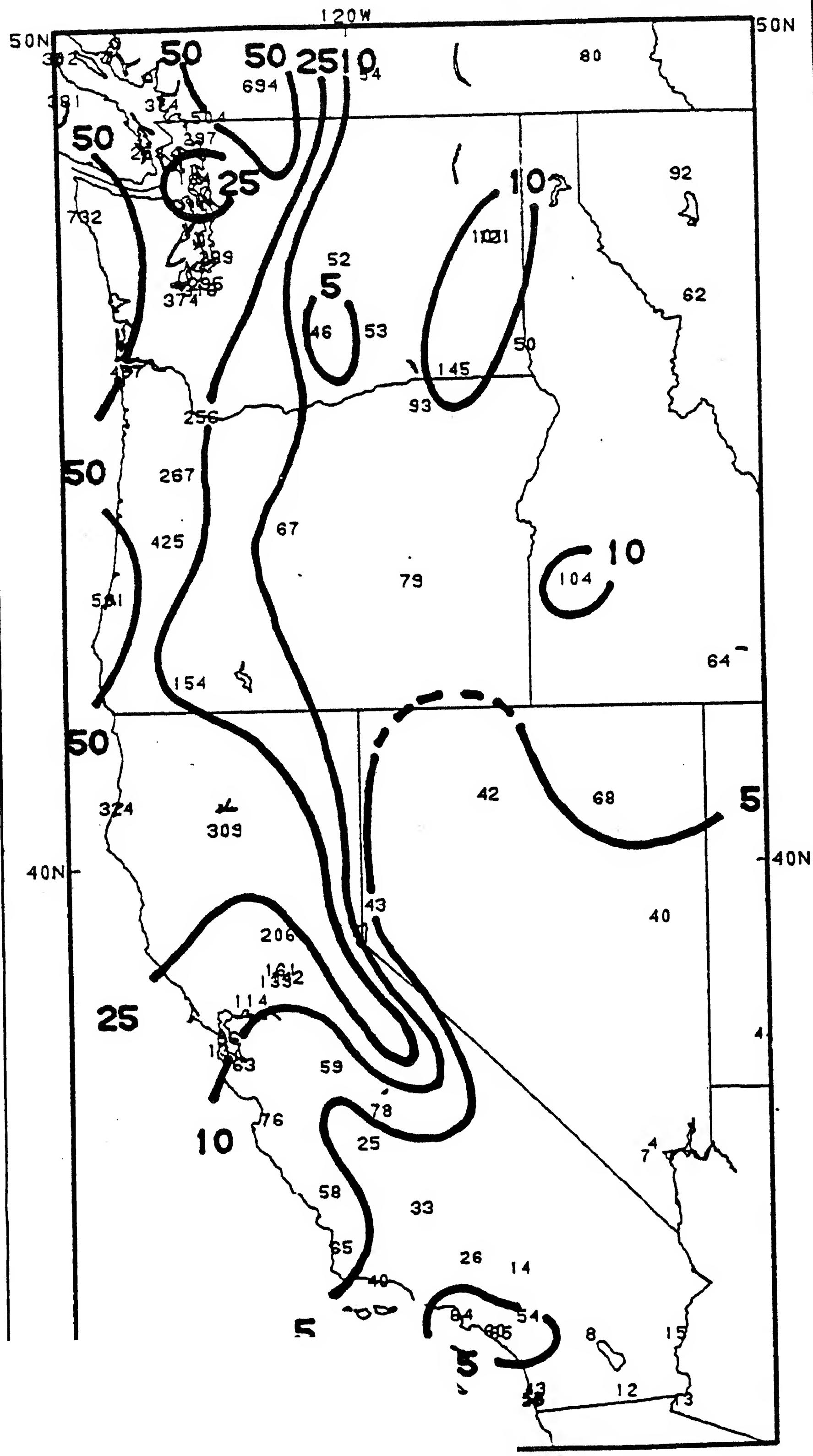


Figure 1. Percent of the annual precipitation that normally occurs during October-April, and isopleths are only drawn for 50, 75, 90, and 95%. Much of the annual precipitation usually falls during the winter season along the Pacific Coast and in the Intermountain West.

Normally, much of the Far West receives the bulk of their annual precipitation during the winter months (December-February), although significant precipitation may also fall during the transitional months of autumn (October and November) and spring (March and April). As depicted in Figure 1, the period from October-April normally accounts for over 85% of the annual precipitation along the Pacific Coast and the Intermountain West. By the late spring and into the early fall, most of these areas usually record little or no precipitation, especially in the southern portions (e.g. California), as many locales depend upon mountain reservoirs and run-off from the mountain (e.g. Sierra Nevada, Cascades) snowpack to supply irrigation, drinking water, and hydroelectrical power.

Since October 1, 1988, much of the Far West has recorded below normal precipitation, most notably the southern half of California (see front cover). This marks the third year in a row that most of California has observed subnormal winter precipitation (for reviews of the last two winter seasons, refer to the Weekly Climate Bulletin #87/18, #88/16, and #88/20). Precipitation totals generally increased from south to north and from east to



·n (inches) during
Station values are
J09 = 30.9"), and
isopleths are only drawn for 5, 10, 25, and 50 inches.

west. During the past 7 months, most of Nevada and southern California reported less than 5 inches of precipitation, while more than 50 inches occurred along the Pacific Northwest Coast and in the northern Cascades (see Figure 2). Isolated stations in sections of the Cascades and Sierra Nevada Mountains also measured more than 50 inches, according to the River Forecast Centers (not shown). With the lack of average precipitation, the largest deficits (more than 6 inches) have accumulated along the coasts of Washington and northwestern Oregon and in northern and southwestern California (see Figure 3).

Based on the April 1989 issue of the "Water Supply Outlook for the Western United States", published jointly by the USDA's Soil Conservation Service and NOAA's National Weather Service, the spring and summer streamflow forecasts for California's Sierra Nevada Mountains are for below to much below average conditions with near average conditions for the Cascades and northern Rockies, an improvement in the latter two areas from previous forecasts thanks to an unusually wet March (see Figure 5). As of April 1, 1989, mountain snowpack conditions were subnormal in the Sierra Nevada Mountains but near to slightly above normal in the Cascades (see Figure 4). With the approach of the normally dry summer months, the best chances for significant precipitation to ease the long-term dryness in California may have to wait until the next rainy season.

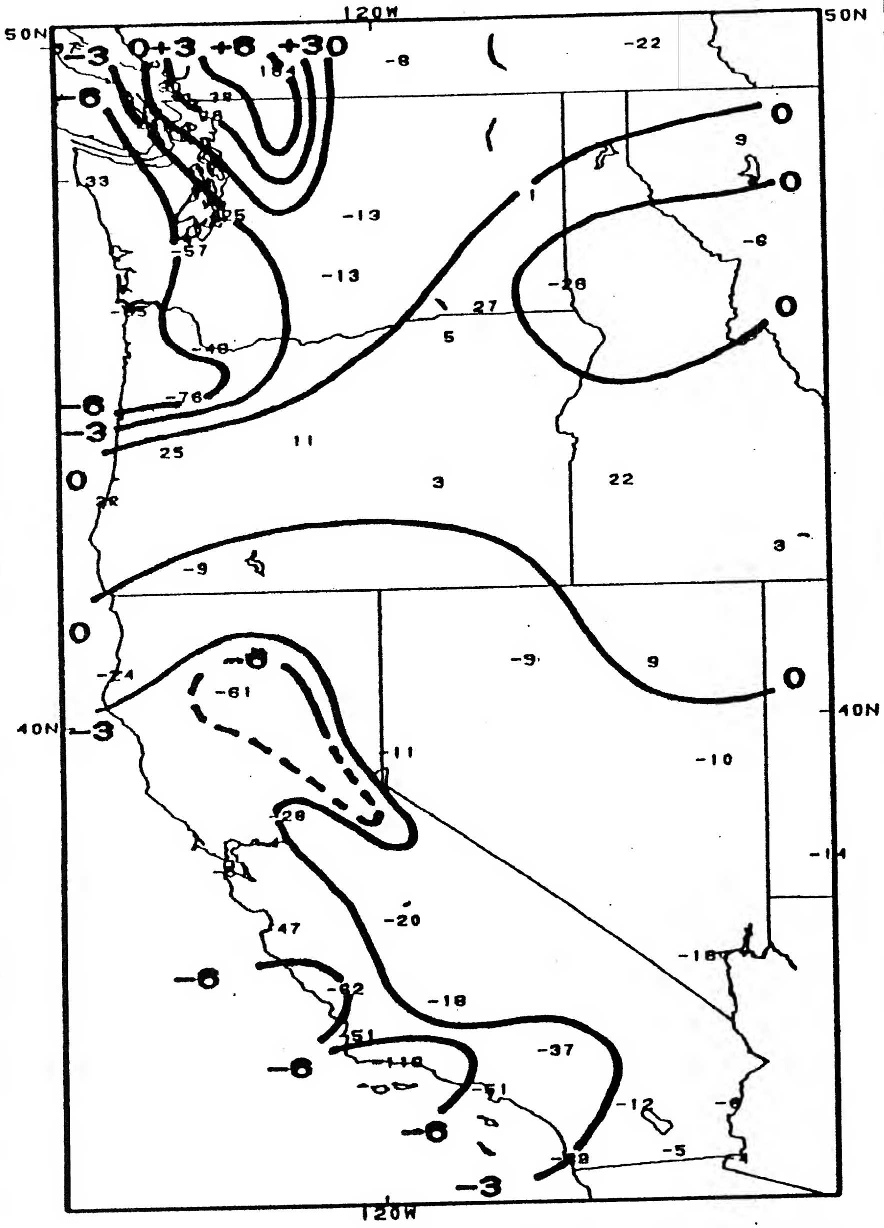


Figure 3. Departure from normal precipitation (inches) during October 1, 1988-April 29, 1989. Station values are in tenths of inches (e.g. -47 = -4.7"), and isopleths are only drawn for -6, -3, 0, +3, and +6 inches.

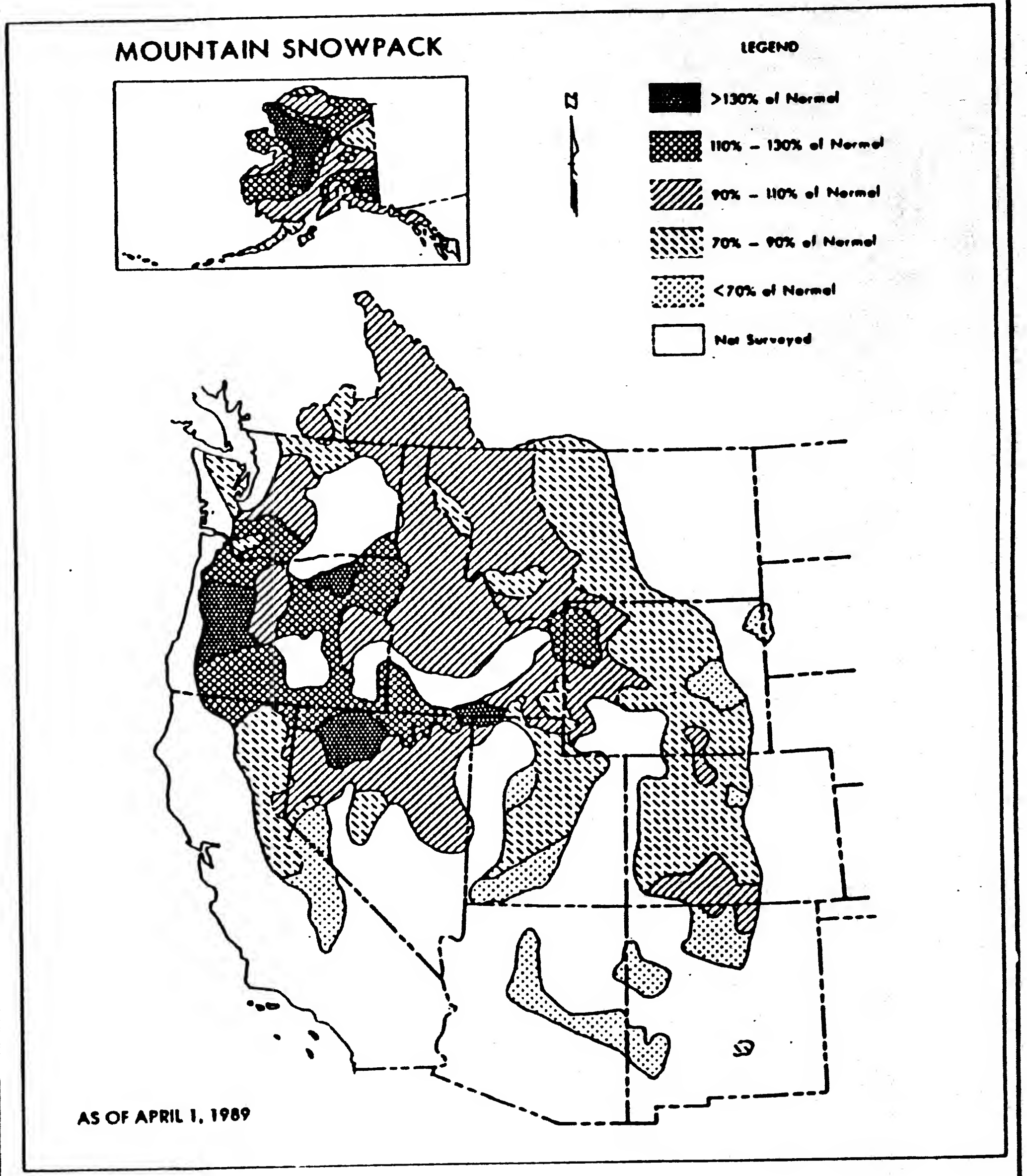


Figure 4. Mountain snowpack conditions as of April 1, 1989, obtained from the "Water Supply Outlook for the Western United States", April 1989, page 6.

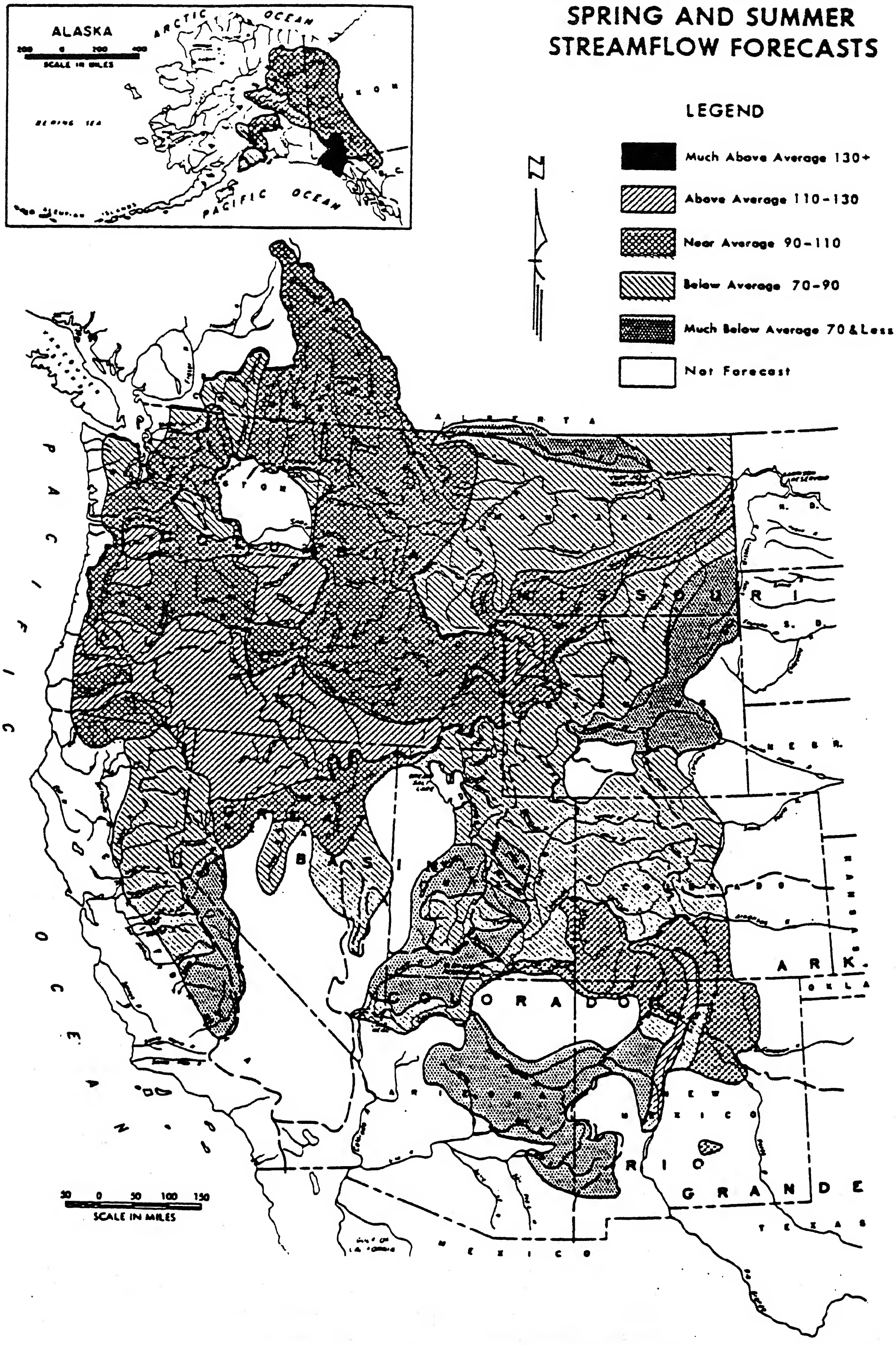


Figure 5. Spring and summer (1989) streamflow forecasts obtained from the "Water Supply Outlook for the Western United States", April 1989, page 7.